ONTARIO MINISTRY OF ENVIRONMENT
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PRELIMINARY SUBMISSION

TO

THE ROYAL COMMISSION ON

ELECTRIC POWER PLANNING

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January 1976

Ministry of the Environment
Ontario

The Honourable
George A. Kerr, Q.C.,
Minister

Everett Biggs,
Deputy Minister

Ont.
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The Ministry of the Environment
January 1976

TABLE OF CONTENTS

PART I SUMMARY.....3

PART II PRELIMINARY.....8

1. Introduction.....8
2. The Ministry of the Environment and Ontario Hydro.....8
   a) The Role of the Ministry of the Environment
   b) Environmental Legislation
   c) Environmental Significance of the Development of Electrical Facilities
3. Perspective on the Purpose and Goals of the Main Hearings.....11

PART III CONTENT OF HEARINGS.....12

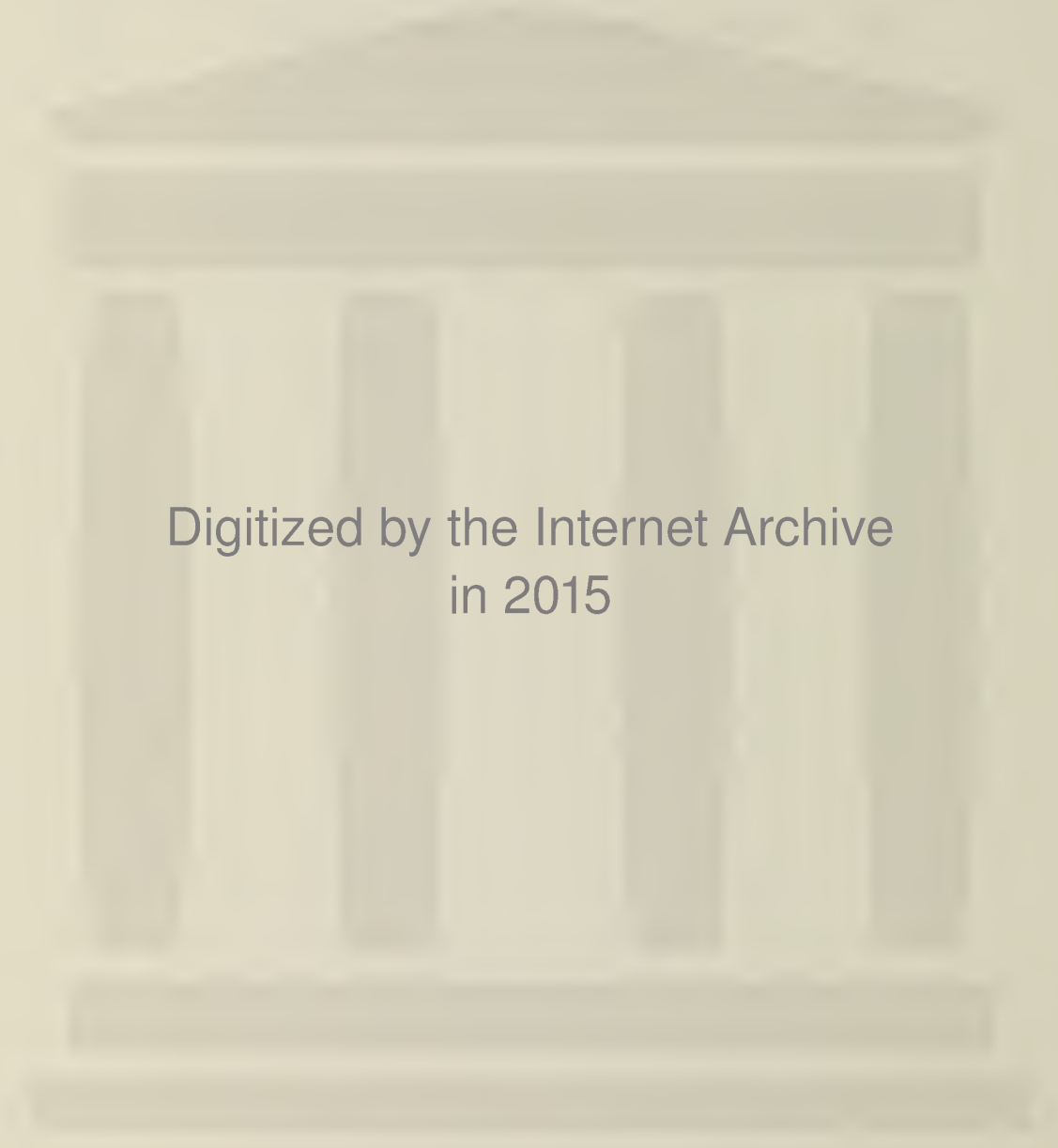
1. Report No. 556SP.....12
2. Provincial Government Policy.....12
3. Demand and "Need".....14
4. An Integrated Framework for Organizing Information.....15
5. Environmental Protection.....19
   a) Water Protection
   b) Air Protection
6. The Context of the Commission's Work.....25
7. Basic Planning and Technological Issues.....27
   a) Basic Electrical Planning Issues
   b) General Technical Issues
8. Energy Conservation.....35
9. Additional Priority Projects.....36
   a) Closing off Options
   b) The Commission's Credibility
   c) Government's Economy Measures
   d) Rate of Load Growth
   e) Import of Electricity
   f) In-Service Time for Generating Stations

10. North Channel G.S. and Other Priority Projects.....42

11. Ontario Hydro's Studies.....44

12. Ontario Hydro's Public Participation Process.....44

13. After the Royal Commission.....45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I SUMMARY

Note: This Summary outlines the most important issues discussed in this Brief. Further explanation and clarification may be had by referring to the main Body of the text.

(1) The Ministry of the Environment, as "guarantor of environmental quality", has a particular interest in the long-range planning of Ontario Hydro, since any electrical development proposals carry within them a wide range of environmental effects.

(2) The Ministry's traditional role has been that of enforcing environmental standards and criteria for water and air quality, under the provisions of The Ontario Water Resources Act and The Environmental Protection Act; The Environmental Assessment Act now emphasizes the increasing importance of preventive aspects of environmental management.

(3) The aims of the Royal Commission's Main Hearings should include the following: to recommend a set of guiding principles for the future development of Hydro; to make such recommendations as would enable the next stage towards implementation to be put in hand; to facilitate public participation in policy decisions regarding Hydro's long-range

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planning; and to stimulate public awareness and dialogue regarding the role within the Province of Hydro's programmes.

(4) The role of Hydro relative to Provincial Government Policy requires consideration. Is Hydro operating, under the Government processes, as an instrument for the implementation of Government policy, within an overall broad planning and energy strategy?

(5) As an aid to the Commission and public, an integrated framework for organizing the complex range of factors which must be considered by the Commission, is suggested in this Submission. This suggestion involves relating all factors to alternative annual rates of growth of generating capacity. All the implications of such alternative scenarios could then be examined and compared, as a guide to future action.

(6) The product of the Commission's work should be the first, and most important main step in a series suggested as follows:

i) The Commission will aim at establishing the principles and procedures to determine the amount and scheduling of electrical power,

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and advising by what general technical means this should be accomplished;

ii) By the application of these principles and procedures, the amount of power would be dealt with either by the Commission, or by consultation between the Ministries, Hydro, and the public, with Cabinet as ultimate decision-maker.

iii) The phasing and scheduling of power would be dealt with either by the Ministries and Hydro together, or by the Ontario Energy Board. Financing recommendations would remain with the Ontario Energy Board;

iv) The locational aspects of the system plan would be dealt with under the Environmental Assessment procedure.

(7) Basic planning issues and concepts to be addressed include the following; all have an environmental dimension:

load forecasting, reliability, import and export of electricity, pricing policy, economics of various growth scenarios, dynamic energy analysis, energy conservation, national energy policy.

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(8) General technological issues to be addressed include the following; again all have an environmental dimension:

> types of generating facilities and fuel, the nuclear programme, large multi-station energy centres as compared with smaller scale generating facilities, generating station location, generating station cooling systems, new technologies and improvements in existing technologies.

(9) The Ministry seriously questions the advisability of granting Hydro's request, in its Preliminary Submission to the Commission (May 1, 1975), for "additional Priority Projects". Reasons for advising against this include the following:

> the rate of load growth forecast by Hydro now appears unlikely to be achieved; the period suggested by Hydro for generating station construction (from concept to in-service) could be reduced; decisions in favour of such Projects will close off future options; such decisions may affect the Commission's credibility with the public; and Government economy measures may affect Hydro's in-service schedules for new facilities.

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(10) Hydro studies presently under way should form part of the Hearings. Where conclusions have already been reached by the Ontario Energy Board regarding some of the key issues and concepts set out above, the subjects would be re-examined with a view to further study, in view of the Royal Commission's wider terms of reference and mandate.

(11) Hydro's public participation programme should be examined, and if found necessary, amendments suggested.

(12) Thought should be given to the form of an ongoing programme of revision and reassessment of Hydro's long-term plans, after the Commission's work is done.

II PRELIMINARY

1) Introduction

On March 13, 1975, Mr. Allan Grossman, (then Provincial Secretary for Resources Development) announced the creation of an independent Commission of Inquiry into the long-range planning of Ontario Hydro, to be chaired by Dr. Arthur Porter.

This Brief has been prepared as a preliminary submission to the Royal Commission, and suggests some approaches for the Commission to take in addressing its task. It sets out, from the point of view of the Ministry of the Environment, some of the subjects and concerns with which the Commission should deal. The Ministry's Main Brief, to be presented later, will develop in greater detail a selection of the subjects discussed in this Brief.

2) The Ministry of the Environment and Ontario Hydro

a) The Role of the Ministry

The Ministry of the Environment's role in recent years has been defined as "guarantor of environmental quality", and as such, the Ministry has a particular interest in the long-range planning of Ontario Hydro. By their very nature, any proposals resulting in the establishment of new electrical generation or

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distribution facilities, inherently carry within them a broad range of effects on the natural and social environment.

b) Environmental Legislation

The Ministry is directly concerned with the protection of the environment, through its administration of The Environmental Assessment Act, The Environmental Protection Act, The Ontario Water Resources Act, and The Pesticides Act.

Under the provisions of The Ontario Water Resources Act and The Environmental Protection Act, the Ministry has developed and applied water quality criteria and guidelines, air quality regulations, and a program of pre-development review.

In accordance with an overall environmental management approach, the Ministry's familiar role of "environmental policeman", (enforcing standards and objectives in order to protect the environment), and of builder of sewer and water systems, has been set within a broader, environmental planning context. The stress has been increasingly on the preventive aspects, rather than on the after-the-fact, "environmental policeman", approach. The significance of this Ministerial role was recognized and enhanced by the passing of The Environmental

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Assessment Act.

c) Environmental Significance of the Development of Electrical Facilities

The environmental effects, both short and long-term, which are produced as a result of the development of electrical facilities, may be both direct and indirect; the developments themselves may be categorized as either primary and secondary.

The development of a new generating station is an example of a primary development, for which it is necessary to consider the direct and indirect effects on the environment, of its construction and operation. The same considerations of direct and indirect effects apply to the secondary development in connection therewith. Such secondary development would include developments such as housing, schools, shops, and roads and sewer and water servicing schemes, which would serve Hydro personnel and associated population.

It is also possible that, by thus providing favourable conditions for development, other large industrial concerns might be encouraged to locate in the vicinity.

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3) Perspective on the Purpose and Goals of the Main Hearings

The Terms of Reference, under which the Commission is operating, obviously aim at the most comprehensive examination possible of all aspects of Hydro's operations, present and proposed. With this as a basis, we offer the following perspective on the purpose and goals of the Main Hearings, as an aid in further developing a strategy towards implementation:

(a) To recommend a set of guiding principles for the future development of Ontario Hydro. This would be arrived at through a process of considering all relevant factors, including environmental ones and those concerned with the quality of life, and determining the nature and relative significance of the criteria to be used in formulating these guiding principles.

(b) With the foregoing principles in mind, to make such recommendations as would enable the next stage towards implementation to be put in hand.

(c) To facilitate public participation, involvement - and a sense of involvement - in the formulation of difficult policy decisions regarding Hydro's long-range planning.

(d) To stimulate public awareness and continuing dialogue regarding the role of Ontario Hydro's programmes in relation to other Government programmes, in the evolving planning strategy of Ontario.

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III CONTENT OF HEARINGS

(1) Report No. 556SP

Hydro's Report titled "Long-Range Planning of the Electrical Power System", No. 556SP, is described by Hydro as a background document only, and not a specific programme for developing new generation and transmission. Taken in this sense, therefore, it would be inadvisable to subject it to detailed analysis as Hydro's "plan for the future". Rather only those matters which bear on the main issues to be addressed by the Commission should be extracted.

(2) Provincial Government Policy

The role of Ontario Hydro relative to Provincial Government policy, and planning and development strategy, requires detailed consideration. Task Force Hydro, in 1972, recommended that Hydro be a delivery agency of the Provincial Government, and that it discharge its responsibility in compliance with the overall policy of the Provincial Government. The Task Force listed a broad range of policy issues to be addressed in defining Hydro's mandate.

A further interpretation of Hydro's role or mandate is now in order, to reflect the requirements of today's society. Is Hydro operating, under the

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Government processes, as an instrument for the implementation of Government policy, within an overall broad planning and energy strategy? Hydro traditionally held the view that its prime responsibility was that of "supplying the demands of the people of Ontario for electrical energy at the lowest feasible cost consistent with...a high quality of service...and subject to the social, economic and environmental concerns of the people of Ontario", (Submission to the Ontario Energy Board, December 19, 1973). The emphasis must be on the production of electrical power in accordance with the considerations of the overall net benefit of the residents of Ontario. In the judgement as to what this best alternative might be for the Province, all relevant considerations, including those of natural environment, economic and social questions, developmental pressures and policies and land-use planning, should play their part; they would be taken into account from the start of the planning process - and not just at the end. This would also help to ensure that environmental and social costs be included within the costing of electrical power.

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In the first half of 1975, Hydro held a series of seminars with participants from a variety of Government Ministries, organizations, and citizen interest groups. One of the principal recommendations to emerge stressed the urgent need for a developmental strategy on a broad Provincial scale, within which Hydro could rationally fit.

(3) Demand and "Need"

In examining the various options open to the Province for the provision of electrical power, the Commission should consider future demand, and how - or how far - it should be satisfied, having regard to the best interests of the people of Ontario. This should take into account not only financial costs, but the "costs" in terms of quality of life, and the fabric of the Province, with regard to both the natural and social environment.

When considering the desirability of various developmental schemes, "need" has frequently been debated as being the basic question to be answered; however, it does not appear to have been defined satisfactorily. The determination of need implies the existence of goals. What are the appropriate goals for guiding long-term policy?

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TABLE NO. 1: SUGGESTED CONCEPTUAL FORMAT FOR COMPARING THE IMPLICATIONS OF ALTERNATIVE GENERATING CAPACITY SCENARIOS

ISSUES	ANNUAL RATE OF GROWTH OF GENERATING CAPACITY *					
	0%	2%	4%	6%	8%	10%
1. Generating Technology, e.g: - nuclear - fossil - other						
2. Economic Implications, e.g: - cost of system - possibilities for economic growth - energy import & export - price of power						
3. Environmental Implications, e.g: a) Natural - air - land - water - ecosystems b) Social - community impact - health - life style - aesthetic - quality of life - regional effects						
4. Quality of Service, e.g: - reliability - reserve capacity - interruptible supplies						
5. Land-Use Implications, e.g: - present - proposed - potential						
6. Consistency with Government Objectives, e.g: - agriculture - housing - development - population - regional planning						
7. Need for Supporting Policies, e.g: - pricing - conservation - economic growth - population - regional planning						
8. Others						

* Note:
For simplicity of presentation, individual growth rates are listed. However, patterns of growth involving growth rates which change through time should also be considered.

(4) An Integrated Framework for Organizing Information

A major problem confronting the Commission will be the co-ordination and synthesis of a wide range of views and information dealing with the many diverse issues relating to electrical generation in Ontario. We therefore suggest here a convenient method of organizing such a complex range of factors.

Within a general examination of economic growth, the growth of energy demand, and specifically of electrical demand, is a prime consideration. The growth of generating capacity, which is associated with that demand, is a key issue, to which most other concerns may be related. It is therefore suggested that it be used as the basis for alternative scenarios for the Province.

Table No. 1, (which appears on page 15), shows a conceptual format for such an approach. As can be seen, varying annual rates of change in generating capacity are assumed and considered, within the context of the overall energy situation in Ontario. By this means, the Commission and the public could examine and compare all the implications of the alternative scenarios, and more easily assess their desirability and practicability.

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The same approach could be used employing variables other than the annual rate of growth of generating capacity. However, this particular variable is consistent with the Commission's responsibility of developing practical recommendations about electricity generation. It should be noted that the Issues and Rates of Growth given in the Table are only examples.

The purpose of the Table is to indicate that each particular rate of growth in generating capacity has different technical, economic, social, natural environmental and policy implications. Some examples of the use of this format in comparing the effects of different rates of growth are as follows:

An increase, say, in the rate of growth, above the historic rate of 7%, might limit the choice of technologies to fossil and nuclear sources, with the emphasis on nuclear. Economic, social, and natural environmental consequences which follow from this may include the following:

> pressure on the market for capital and skilled labour, possible disruption of farming communities, an increase in the risks of exposure to radiation, and an ongoing commitment to a large centralized system of electricity generation, and to the large and impersonal institutions necessary to support it. Possibly, new Government policies would be required to achieve the economic growth which the

electricity is intended to service.

In contrast to this, say a 4% rate of growth would reduce the need for reliance on conventional fossil and nuclear technologies. It would perhaps allow time for the development of alternative methods of energy generation, such as solar and wind power. In their turn, these alternative technologies carry with them economic, social and environmental implications as well as requirements for policy initiatives. For example, in order to achieve a 4% rate, conservation of energy would probably become an important objective. This in turn might require that a significant increase in the price of electricity be considered, as part of the strategy of achieving reduced demand.

It is also important to consider patterns of energy growth involving changes in the growth rate through time. An example of this would be a declining rate of growth, culminating possibly in a steady state, based on energy "income" from renewable resources rather than on energy "capital". This scenario in particular requires emphasis to be placed on the period beyond 1993.

The approach as outlined above,which focuses on the implementation of alternative patterns of electricity

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growth, has several features to commend it.

i) It will avoid a disjointed examination of the issues;

ii) It will provide a coherent framework to which the public can relate;

iii) It will facilitate a discussion about, and choice among, the various alternative futures for the Province, on which decisions about electrical energy ought to be based;

iv) Above all, it will highlight the critical importance of reconciling policies with the objectives which they are intended to meet.

From the various issues discussed above, it is clear that in order to examine the issues before us, a wide and extended view is necessary. The Commission has been charged with examining Hydro's long-range plans" for the period 1983 to 1993 and beyond"; the interpretation of "beyond" should extend, at least in general terms, well into the next century.

If the Commission adopts this, or any similar, integrated framework, it might even be suggested to prospective interveners that, as a help to the Commission, they present their contributions in a form which is related to this overall "gameplan".

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Of course, it would be made clear that each intervener would not be obliged to survey the whole range of possibilities, and it would remain the Commission's responsibility to bring together the disparate ideas, opinions and information received from the participants.

(5) Environmental Protection

As mentioned previously, the Ministry, in its familiar role as "environmental policeman" has based, and will continue to base, its environmental protection activities related specifically to water, land, and air, on The Ontario Water Resources Act, and The Environmental Protection Act. Within the context of these Acts, environmental concerns involving the provision of electrical power, relate to water-taking and waste discharges to both air and water by generating stations, and those effects on land and water caused by the building and maintenance of power transmission lines. Broader concerns, as set out in The Environmental Assessment Act, are discussed elsewhere in this Brief.

a) Water Protection

On the subject of water protection, the basic definition of pollution, and the legal basis for

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its control and prohibition, is contained in Section 30 and following Sections of The Ontario Water Resources Act. Section 14 of The Environmental Protection Act contains a general prohibition against discharging contaminants into the natural environment.

The Ministry's strategy for water protection is to apply the standards set out in its publication, entitled "Guidelines and Criteria for Water Quality Management in Ontario". These refer to the fact that

> "use of water...must take into consideration the variety of uses, including public, agricultural, and industrial supply, recreation and aesthetic enjoyment, and the propagation of fish and wildlife... There should be a constant effort to improve the quality of water... All wastes prior to discharge to any watercourse must receive the best practical treatment or control".

Of specific application in the field of electrical generation are supplementary guidelines titled "Criteria and Guidelines for Waste Heat Discharges to the Great Lakes System", to be applied to generation stations commencing operations after January 1, 1982.

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It should be noted that development to their full engineering capacity of existing or potential generating station sites would require, under present techniques, a cooling water flow of approximately 200,000 cfs; this is roughly equivalent to the outflow of the Upper Great Lakes at the St. Clair River. The potential generating stations referred to include those under construction, in the approvals process, designated as priority projects for the Commission, or requested in Hydro's Preliminary Submission.

There has been a good deal of discussion with regard to the environmental effects of waste heat discharge to lakes and rivers from thermal power plants. One aspect of water pollution which has created much argument is the question of the detrimental or beneficial effects of waste heat on aquatic ecosystems. Evidence from environmental studies at operating thermal generating stations in Ontario and elsewhere, indicates that the taking of large quantities of water for cooling, and a discharge of waste heat, chemicals and radioactivity to water, have had measurable effects on the aquatic environment.

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b) Air Protection

On the subject of air quality (and solid waste management), Sections 5 and 14 of The Environmental Protection Act contain general prohibitions against discharging contaminants into the natural environment. The strategy of the Ministry for air protection is by the enforcement of Regulations passed under The Environmental Protection Act, the most applicable being #15 and #872/74. These Regulations have themselves the force of law, (in contrast with the Guidelines and Criteria for Water).

Air quality management in Ontario is based on ambient air criteria objectives derived from the observed effects of contaminants on humans, animals, vegetation and property. In order to meet these objectives, the Ministry has developed standards, which take into account the possible presence of several plants emitting the same pollutant into the same area, and form the basis of a central control strategy.

The standards are applied at the so-called "point of impingement", rather than at the point of emission. Thus an emission source in a heavily built-up area is subject to tighter controls than a similar source

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in a sparsely inhabited location. Considerations which are taken into account include variations in windspeed and atmospheric stability, and the rate and height of emission. All of these affect ground level concentrations, and thus the effects of air contaminants.

Since the contribution of Hydro to the local load of air contaminants in the vicinity of conventional thermal stations is high, guidelines have also been developed allowing for anticipated developments which might also contribute to declines in ambient air quality. Such guidelines allow Hydro to plan its operations to meet foreseeable demands on the air resource, and thus help prevent situations where technology would have to be changed subsequent to a plant's construction. These guidelines are based on ambient air conditions likely to arise within a radius of 30 miles of a generating station.

It should be noted that, under a recently-signed Federal-Provincial accord regarding air management, the Province has agreed "to establish and enforce requirements at least as stringent as the agreed national baseline requirements". The Province's current Regulations may therefore require amendment to take account of this.

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(6) The Context of the Commission's Work

The product of the Commission's work should be considered as the first, and most important main step in a series of studies, recommendations and approvals, to be applied in developing Hydro's Long-Range Plan. Each portion of the procedure will be dependent upon decisions taken at the previous step. We see these main steps as follows:

a) The Commission will aim at establishing a set of principles and procedures to be followed in determining the amount, and scheduling, of electrical power during the period under discussion, and advising by what general technical means this should be accomplished.

b) The next step will be the application of those principles and procedures, in order to determine the amount of electrical power to be provided. This step could perhaps also be undertaking by the Commission. Bearing in mind the necessity of fitting in Hydro's expansion programme with Government programmes and strategies, another alternative would be for this step to be dealt with by means of consultation between the Ministries, Hydro and the public, with ultimate responsibility residing in the Cabinet.

...

c) On the basis of the principles established by the Commission, the phasing and scheduling of the provision of electrical power, could either be dealt with by the Ministries and Hydro during the process outlined in (b) above, or be handled by the Ontario Energy Board. In any case, the Ontario Energy Board would advise on the financing of the recommended amount of power, in accordance with its present function.

d) The Environmental Assessment procedure would deal with the locational aspects of the system plan. Such major Hydro projects fall within the purview of The Environmental Assessment Act. The definition of "environment" in this Act is set in the broadest terms, and includes not only the natural environment, but also "man" within the environment. This means that an environmental assessment must also take into account social and economic factors, land-use planning, etc. Studies are undertaken leading to the production of an Environmental Assessment document, and recommendations as to the location of generating and transmission facilities. These studies include: size and type of facilities, environmental suitability of alternative locations (with environment regarded in its broadest sense, as in the Act), alternative

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transmission corridor layouts and their relationship with load centres.

(7) Basic Planning and Technological Issues

In the course of its work, the Commission will examine basic planning issues for long-range electrical planning, as well as technological ones. Some of these are listed later in this Section; of course, they are simply examples, and are not meant to be exhaustive. Each of these issues has also an environmental dimension, which must be considered. Recommendations on some of these subjects were made by the Ontario Energy Board, in August 1974. However, in view of the Royal Commission's broader mandate and larger-scale hearings, and shifts in the concerns of both Government and public since that time, we suggest that the Commission include all these subjects within the scope of its enquiry.

a) Basic Electrical Planning Issues

Basic planning issues which should be examined include the following:

i) Load Forecasting

A comparison of load forecasting techniques and a recommendation as to the most acceptable one.

There are of course, many methods of forecasting which should be investigated and compared. Owing

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to today's fluid situation, techniques which were appropriate in a more stable past, may be less so now. In a broader sense, forecasting should be regarded as part of an overall planning procedure, where forecasts are related to goals and the policies intended to achieve them. In this way, proper account can be taken of economic effects, and the effects on the natural and social environment. A more detailed discussion regarding growth in demand is contained in Section 9 (below).

ii) Reliability

Concepts of reliability, including those of availability and security.

Providing for these entails the provision of extra facilities, with extra environmental effects. Requirements of "availability" imply, among other things, a measure of generating station redundancy. There is a continuing trend towards larger reactors. Is this desirable from the point of view of reliability, since increased size involves untried technology, and equally large back-up reactors are also necessary? Requirements of "security" imply extra transmission lines. The role of risk analysis in this context should also be examined.

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iii) Import and Export of Electricity

(See also (7)a)viii) and (9)e) below).

The relationship between the need for reserve capacity and the import and export of electricity should be examined. Obviously, the provision of extra facilities as well as the increased operation of existing facilities could have important environmental effects.

iv) Pricing Policy and the Price Elasticity of Demand

This includes an examination of the effect on demand of higher prices for electricity, the significance of this for future demand, and the electrical facilities necessary. Proposals to relate electricity prices more closely to costs, to allow for peak load problems and regional cost variations, should be examined. (See also Section 9 below).

v) Economics

A comparison of the economic feasibility of various growth scenarios, and their implications, including environmental ones.

This should include a comparison of the economic and environmental effects of supplying power for an end use, with conservation measures to reduce the power requirements of that end use.

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vi) Dynamic Energy Analysis

Such an analysis, especially with regard to nuclear programmes, indicates that rapid expansion of nuclear facilities will demand, at least for a decade, an increasing Provincial requirement for fossil fuels. Not only does this cast doubt on the ability of nuclear power to provide a substitute for fossil fuels, particularly in the short term, but it suggests that the adoption of an expanding nuclear-intensive programme of energy production may make a smooth transition to an energy system based on renewable energy sources difficult to achieve.

vii) Conservation

Conservation policy and methods: see below, Section (8).

viii) National Energy Policy

This should take into account the recommendations set out in Mr. McKeough's report on energy policy of June 1, 1973, and the implications on the need for further generating and transmission facilities of current proposals to "close the gap" in a national east-west link in northern Ontario. Items ii) and iii) above, and (9)(e) below, are also relevant in this regard.

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b) General Technological Issues

Following are some of the general technological issues which should be examined; as stated earlier, all have an environmental dimension:

i) Generating Facilities

Comparison of the various types and sizes of generating stations and operating units, the different types of fuel available, and their implications and effects. For example, the burning of fossil fuels (oil, coal, gas), will emit contaminants, via the stack, to what is a limited atmospheric resource. However, thermal emissions to the water will be less than those from nuclear stations. Indirect environmental effects include those occurring during the production and transportation phases of fuel, and these should also be examined.

ii) Nuclear Programme

The nuclear programme and its implications, for instance:

- different types of nuclear generation: CANDU, breeder, LWR, fusion;
- different sizes of reactor units;
- nuclear safety: radioactive emissions, storage, transportation and disposal of nuclear wastes, terrorism, nuclear disaster including contingency planning;

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- heavy water production - implications and effects;
- economic and energy analysis (see 7 vi) above).

iii) Large "Energy Centres" v. Smaller Generating Sites

Comparison of fewer, large, "energy centre" sites (with or without associated industries), with a larger number of smaller generating station sites. Some considerations are as follows:

- Large energy centres involve concentrated environmental impacts from generating stations, and from the greater size or number of transmission corridors required. Conversely, fewer energy centres mean that fewer locations are impacted.

- For the same degree of reliability, fewer large generating units require more "back-up" capacity than smaller, more numerous ones.

- Fewer, large energy centres probably imply a 500kV. Provincial Grid System, with attendant environmental effects.

- Large fossil-fuel energy centres require tall stacks, with possible environmental effects such as: acid rain from high level SO_2 transfer;

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changes in the earth's atmospheric chemistry, in particular the absorption-reflection rates of solar and terrestrial radiation; stack "line-up" from one urban area to another, e.g. Cleveland-Nanticoke-Hamilton-Toronto, or Detroit-Toronto-Montreal.

- Fewer, large energy centres may make for more efficient land use, by requiring less land overall.

- Specifically in regard to nuclear energy centres: Fewer sites may allow more reliable safeguarding and storage of radioactive materials and wastes; may lead to more limited necessity of transporting such materials; and will allow the establishment of a minimum number of permanent radio-active sites.

iv) Location of Generating Stations

- Some of the implications of remoteness of generating stations from, or proximity to, large populations and load centres are:

  . Generating stations sited remote from large populations do not directly affect them. However, by the same token, people are affected who do not even have the compensation of being served by those facilities.

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This is seen not only in the local effects of generating stations, but also the effects of the large transmission corridors which are necessary to connect them to the load centres;

- Remote generating stations may involve large energy centres, and a grid system;

- Other considerations of remote generating stations are: cheaper land, the wish to keep nuclear generating stations away from large populations, and the desire not to add to already high pollution concentrations associated with large population centres.

v) Generating Station Cooling Systems

- This would include a review of the pros and cons of once-through cooling (effect on water-bodies), cooling towers (atmospheric effects), and the use of waste heat.

vi) New Technologies, Improvements in Existing Technology

The potential and implications, both environmental and technical, of improvements in existing technology, and of new technologies, should be examined. In considering new technologies the emphasis should be on their use of renewable

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resources and their low pollution characteristics.

Some examples of new or improved technology are:

- greater efficiency for existing generating technology;
- coal gasification;
- garbage incineration;
- solar energy;
- bio-energy (combustion, production of methane gas, alcohol);
- geothermal energy;
- wind energy;
- Energy storage systems (pumped storage, steam storage, hydrogen storage).

(8) Energy Conservation

A wide-ranging study should be made of the role of energy conservation, and methods of achieving this. Conservation of energy is one means of ensuring a reduced growth in demand. Obviously, from an environmental point of view, this will involve less impact on both the natural and social environment. An intense and concerted conservation effort will allow "breathing space" for the bringing into production of further sources of energy, whether "traditional" or advanced, and allow time for a clearer picture to emerge, of what the future holds in store. If, for reasons such as the fear of nuclear hazards or the economics of net energy analysis, it is decided that "softer" energy ...

technologies be used, conservation may allow the time for these to be developed or perfected.

Conservation practices include: general encouragement of electricity saving; improved efficiency in electrical generation and transmission, and in the mechanical use of electricity; improvements in building design and insulation; the development of urban forms which help energy conservation; and Government policy aimed at eventual near-zero energy growth (including pricing policies, and the limiting of energy-intensive industrial processes).

(9) Additional Priority Projects

In Mr. Grossman's statement of March 13, 1975, and in the Commission's Terms of Reference, several "Priority Projects" are referred to, on which the Commission is asked to consider and report as to the "need". (These are further discussed in Section (10), below)

From Hydro's Preliminary Submission to the Commission, dated May 1, 1975, it appears that Hydro is also requesting, on a similar plea of urgency, that many "additional Priority Projects" should be dealt with on the same basis by the Commission. These include four new generating station sites in the East System, at least one generating station site in the West System, and several 500kV. transmission links.

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This Ministry seriously questions the advisability of this, or any other request for extra projects at this time, being granted. Some of the reasons for this view are as follows:

a) Closing-Off Options

If a commitment to these extra facilities is made, the Commission's work might be negated to a large extent. The main structure of the future electrical supply system would have been set irrevocably, and options which the Commission is supposed to discuss will have been closed. If each generating station site were viewed, in accordance with current Hydro policy, as potentially able to accomodate a total of 12,000Mw capacity, Hydro would have sufficient sites for power needs for a period extending well into the next century, even at a 7% annual growth rate.

b) The Commission's Credibility

The consideration of the extra projects requested could be particularly damaging to the Commission's and Government's credibility before an enlightened and concerned public. The Environmental Hearing Board Hearings on the southern end of the Bradley to Georgetown right-of-way, in the summer of 1975, were indicative of this public concern.

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c) Government's Economy Measures

The announcement last year by the Honourable Darcy McKeough, in connection with Hydro, of a 10% administrative cut and a minimum of $1 billion reduction from its long-term investment programme, may mean a postponement for several years of Hydro's initiation and completion schedule for some generating stations.

d) The Rate of Load Growth

While long-term predictions are uncertain, over the study period it now appears increasingly doubtful whether the 7% rate of growth traditionally predicted by Ontario Hydro will materialize.

A reduction in Hydro's estimate of the rate of growth of demand over the next ten years, was announced in a submission by Hydro to the Ontario Energy Board (June 1975). The stated reason for this was the reduction in the demand for power from the U.S., due to the recession, and to uncompetitive prices requested by Hydro. The increase in demand for electricity in Ontario has also been much reduced.

While caution must be used in evaluating the relevance of what may be short-term phenomena, long-term reductions in the growth of demand for power are also likely because:

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i) The price of electricity, as well as of other forms of power, is expected to rise substantially, and thus the increase in the use of electricity by Hydro's customers may be reduced.

ii) A reduction in the rate of economic growth in Canada and Ontario, would directly reduce the demand for electricity. This reduction could be due to inflation and policies designed to deal with it, a reduced rate of growth of population, smaller gains in productivity, and slower growth of world trade.

iii) An energy conservation programme which is being fostered by the Federal and Provincial Governments, may lead to a significant reduction in the growth in the demand for electricity.

iv) The Government's planning strategy, and greater integration of Hydro within it, may lead to a reduction in the demand for power, particularly in specific areas.

The first two of these points are strongly supported by the work of F.W. Gorbet of the (Federal) Department of Energy, Mines and Resources. On the basis of plausible assumptions, he has forecast a decline in average annual rate of growth in the demand for

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electricity in Canada, from 6.4% (1960-1972) to 4.5% (1972-1990). It is noteworthy that this forecast allows for a substantial increase in the relative share of electricity in primary energy production, from 32.8% (1972) to 38.5% (1990).

e) Import of Electricity

On January 14, 1976 it was announced that negotiations between Ontario Hydro and Manitoba Hydro for a further agreement to import electricity from Manitoba were well advanced.

f) In-Service Time for Generating Stations

Hydro has based its request for these extra facilities, as well as those for the "Priority Projects", on the grounds of urgency. Owing to the length of time taken for capital works from concept to in-service date, Hydro considers that it cannot wait for the outcome of the Royal Commission. Hydro quotes eleven to twelve years minimum for a generating station; with possible delays, due the involvement of Government agencies or public participation, adding up to three years more. We consider that these time figures are too high; actual construction time may well be five or six years (depending on whether the generating station is fossil or nuclear), as compared with Hydro's figure of six or seven years. Lengthy delays, caused by Hydro having to study environmental

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and social factors, need not apply if these considerations are fed into the process at appropriately early times. The processes of public participation, environmental assessment, and technical study and design should be largely concurrent, rather than consecutive.

A further factor to be considered is the Report on the Expropriations Act, by R.B. Robinson, Q.C., dated October 1974, which has been well received by the Government. At the moment, owing to the provisions of this Act, and time-consuming procedures and public hearings required under it, Hydro must allow approximately nineteen months for site purchase. However, many key subjects currently dealt with by the Inquiry Hearings held under the Act, will be covered under Environmental Assessment procedures. In these circumstances, Robinson recommended that Expropriations Act Hearings, if they take place at all, should deal with severely limited matters; this would lead to a great saving in site acquisition time.

It is therefore appropriate to suggest that up to two years may be deducted from Hydro's time schedule, thus allowing more time for proper consideration of long-range planning issues.

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Taking into account all the factors outlined above, the Ministry considers that any advantages gained by bringing forward additional Priority Projects, will be far outweighed by the disadvantages of doing so.

(10) North Channel G.S. and Other Priority Projects

While preparing the points set out in the previous section, it became clear that, in considering the Priority Projects listed in the Commission's Terms of Reference, the Commission could apply the same arguments when scrutinizing them.

For example, the North Channel Project could be examined using the same criteria. The key issues are:

(i) Load growth; this is most significant in assessing how soon the generating capacity will be required. The uncertainties as to whether 7% load growth will continue in the future have already been set out earlier. In addition, the possibility of an EHV transmission link between Manitoba and north-western Ontario is being actively considered. This obviously has great significance as far as the North Channel Project is concerned, especially since such a link could pass in the general vicinity, and serve the local load centres.

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(ii) The length of time required from concept to in-service of the generating station. This will have an important bearing on the determination of the date by which a decision on the project must be taken. We understand that Hydro's latest in-service dates are 1986 for fossil fuel and 1987 for nuclear. Our examination of their tentative schedule leads us to believe that there is still adequate time for the Commission to examine the most important issues. The necessity of making a recommendation may be postponed till a later date in the proceedings than is proposed at present. Our view is based on the possibility of saving time by some of the means outlined in Section (9). For instance, by overlapping operations such as data collection, by taking into account the significance of Robinson's Report referred to above, and by reducing the length of time considered necessary for the Environmental Assessment procedure and for construction.

Hydro's schedule is based on a 7% (compounded) growth: even if this were to occur, which is now doubtful, it would appear that site acquisition need not take place until 1979 at the earliest, leaving six to seven years for construction.

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Taking the above factors into account, we would suggest that if a decision on the "need" of the project cannot be deferred until after the Commission's deliberations, - which is certainly the most desirable course - at least it can be delayed until a later stage, when the shape of the Commission'a final Recommendations will have begun to emerge.

(11) Ontario Hydro's Studies

Ontario Hydro is carrying out various studies in line with the requirements and recommendations of the Ontario Energy Board, the National Energy Board, and Hydro's own research programme. Some of these studies are described in Hydro's Preliminary Submission to the Commission referred to earlier. These studies, or if they are not available in time, their description should be submitted to, and reviewed by, the Commission as public evidence, since they have material bearing on the matters under discussion.

(12) Ontario Hydro's Public Participation Process

Hydro has been carrying out continuing public participation procedures with regard to their various projects. The Commission should review these procedures, in view of their great importance within the process, and Hydro's

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claim of their significance regarding the length of time required for capital works projects to be completed.

(13) After the Royal Commission

Once the Commission has completed its task, there will remain the need periodically to review and update its recommendations, to reflect significant social, economic or technological changes. This should ensure that undue frustrations are not encountered in the interpretation of Commission recommendations, as they may apply to any project or programme of Ontario Hydro in the future.

Some alternative possibilities for carrying out this are:

i) A Standing Committee reporting periodically; perhaps to the Cabinet Committee on Resources Development;

ii) Further ad hoc Commissions, to be established from time to time, when problems of interpretation are seen to be pressing;

iii) A body holding formal periodic Hearings, after the fashion of the Ontario Energy Board.

DJB:ds
Ministry of the Environment
January 1976

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Ontario. Ministry of the Environment.
Preliminary submission to the Royal Commission on Electric Power Planning.

DATE	ISSUED TO
MAR. 1	H. Cockburn